



SCIENCE NEWS-LETTER

The Weekly Summary of Current Science

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(See page 162)

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YOUTH does not always get the credit that it deserves. This is not a plea for the flapper or the college leader. For today they are old, sophisticated and blasé.

This is a hopeless demand that those young thinking animals aged one plus shall be given due acknowledgment and consideration in their superiorly aged adults' plans for their acclimatization to the complex world.

Babies are fed baby talk. Older youngsters are subjected to nursery tales, the uninteresting hulks of old wives' tales and the dregs of generations of superstition. That George Washington never told a lie, that Columbus discovered the world is round, and other historical legends comprise the intellectual diet of primary graders. "You are too young to know" is the damaging refuge of the uninformed, hurried parent.

Native inquisitiveness, one of the essentials of scientific research, is at a high peak in the pre-kindergarten ages. Unspoiled by attempted molding to the standard pattern, the young child is interested in things. His inquiries and thoughts, properly nourished, will bear rich fruit in later life.

Even when the school child grows older and less receptive, the bloom of youthful enthusiasm is not entirely faded. In the first few 'teen years, trees, insects, radio, animals and other concrete scientific activities inspire real interest.

But the child, toddler or senior, hates to be babied by having his activities too simplified or his reading matter too much written down.

The SCIENCE NEWS-LETTER is designed for adult laymen or for scientists (who are laymen except when working in their own little specialized niche). While it is used in many schools, it is not written down. Nevertheless, we are often told: "My boy reads nearly every line" or "I want it for my daughter in school."

Some scientists may rationalize in taking the SCIENCE NEWS-LETTER just as they do when they read the comics to little Johnny or shop for Christmas toys. We suspect they stealthfully read these pages if mother, son or daughter have not gotten there first and read them with scissors.

Editorial

Science News-Letter, March 17, 1928

Man-Made Lightning

Electricity

Three million six hundred thousand volts of electricity can now be stored in artificial "clouds" and discharged in a ten-millionth of a second, as shown on the cover, thus imitating in the laboratory the effects of lightning more accurately than ever before. This feat has been accomplished at the Pittsfield (Mass.) laboratory of the General Electric Company by F. W. Peek, Jr. Such a voltage is seventeen times as great as that carried over even the highest voltage power lines.

"As these sparks last but a ten-millionth of a second, and as light travels about 100 feet in that time, the blinding flash is all over when seen by a person only a hundred feet away," Mr. Peek explained. "Yet the flash appears to be there when he sees it!"

Although these voltages frequently have a duration of less than a millionth of a second, their rate of rise and fall or wave shape has been accurately measured by an instrument using a beam of electrons as a pointer and known as a cathode ray oscillograph.

"The object of the study is to secure scientific information on the nature of electricity and to obtain further engineering information on the protection of life and property against lightning, to build transmission lines, transformers and other electrical apparatus to resist lightning voltages," Mr. Peek said. "Lightning is one of the greatest foes to electrical apparatus, and much has already been done in this laboratory to produce lightning-proof apparatus. The present generator produces higher voltages than ever produced by natural lightning on transmission lines."

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INTERPRETING week by week, the latest developments in the various fields of science, this magazine attempts also to present its articles in the most pleasing and readable topography and the most convenient arrangement.

The *clippability*, *indexing*, and *automatic dating* of each article are unique features.

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Each article is automatically *dated* by its last line.

All of the resources of Science Service, with its staff of scientific writers and correspondents in centers of research throughout the world, are utilized in the editing of this magazine.

Special articles by *eminent authorities* appear frequently.

The reader can keep up with the new books by reading the *brief book reviews* that appear in each issue.

The *great classics of science* are reprinted and interpreted in order that the present generation may appreciate the long and interesting history through which science has evolved.

Science News-Letter, March 17, 1928

Babies in Old Paintings Had Rickets

Medicine

By MARJORIE MACDILL

Rickets, the disorder of the mineral chemistry of the body, that makes babies grow up into bow-legged flappers and unsymmetrical sheiks, has probably afflicted the children of man ever since the dawn of civilization.

Though it was not recognized as a distinct disease until 1650, Dr. John A. Foote, of Washington, a widely known specialist in children's diseases, has recently confronted the medical world with evidence that rickets has been prevalent in babies since very early times and, contrary to general belief, is not the outcome of modern conditions alone.

When the malady that made cod liver oil famous was first described in the middle of the seventeenth century, learned physicians at Cambridge University called it "an entirely new disease" and attributed its cause to conditions that have little to do with diet and sunshine. By the end of the 18th century authorities had reached the conclusion that improper food and climate had something to do with it.

It was thought then, and has been considered more or less generally since, as one of the consequences of the complex conditions of modern life even though it is now widely known that it can be prevented by direct exposure to sunlight.

In defense of his argument that rickets is not one more thing that can be blamed on our degenerate times, Dr. Foote has cited in a report to the American Medical Association a long list of medieval paintings of Germany and Flanders in which early masters have depicted the square heads, big abdomens and sharp lines around the chest, in their representations of the Christ Child that, to the eye of the experienced anatomist, betray rickets.

The countries of the temperate zones have always been heavy sufferers from rickets because the long cold months of winter necessitate confinement within doors and thick clothing that shuts out the beneficent action of the sun's rays. Therefore, it is reasonable to suppose, explained Dr. Foote, that primitive artists unconsciously represented the presence of rickets in their pictures of the Holy Infant, believing it was normal for infants to have square heads, pot bellies and grooved chests.

With the passing of feudalism and the subsequent rise of industrialism, people began to congregate in cities.



THE LARGE HEAD AND BENT LEGS of the infant in this 15th Century painting of Hans Bergmaier indicate that the subject had rickets

In Cologne, Bruges and Nuremberg weaving, metal working and other industries were developed. By 1475, Cologne was an important center of the great Hanseatic league which was formed by countries around the North and Baltic Seas for the purposes of trade. The development of the great trade leagues like this and others led to many civil struggles between burghers and petty rulers of neighboring towns. Peasant upris-

ings contributed to the general strife.

"Thus there existed," explained Dr. Foote, "in the last half of the 15th century ideal conditions for the production of rickets: an industrial population living in crowded walled cities, a northern climate under unhygienic conditions, and the effect of warfare on a society that would be poorly adapted to healthful life in cities even under far more favorable conditions than (Turn to next page)

Rickets in Art—Continued

prevailed in those days. It would be natural to look for evidence of this disease among the people who lived in Cologne and Nuremberg and Bruges between 1450 and 1500, or from a century and a half to two centuries before Glisson described the disease in England.

"Fortunately, the painters of that period made many pictures of religious scenes in which children were used as models, and one can call on that inspired school of painting which flourished so wonderfully in the unsettled years after the middle of the fifteenth century for clinical material.

"Correspondingly, in the pictures of the second half of the sixteenth century one sees a great many well nourished children and fewer rachitic children, despite the fact that rickets appeared in England a century later. One subject favorable for the purposes of this study was also a favorite with primitive religious painters—'The Adoration of the Child,' in which the Infant Saviour was shown lying on the floor entirely naked.

"Among the fifteenth century painters of the Netherlands and Germany whose works I have examined, the following show clinical rickets in the infant: 1447, Stephen Lochner, 'Virgin in the Grove of Roses,' in the Cologne-Richartz Museum; in 1460, Master of the 'Life of Mary,' 'Adoration of the Child,' Cologne-Richartz Museum; 1470, Swabian Master (of Augsburg) 'Adoration of the Child,' in Augsburg Church of St. Moritz, also 'The Nativity' and the 'Adoration of the Magi' in the Maximilian Museum. A number of other of his pictures show the children with the stigmata of rickets. In 1485, Bernhard Striger of Nuremberg, 'The Holy Family,' in the Germanic Museum, Nuremberg; 1490, Michael Pacher of Nuremberg, 'Birth of Christ,' St. Wolfgang Church; 1479, Michael Wohlgemut of Nuremberg, 'Birth of Christ'; Zwicau, Marien Kirche; 1500, Albrecht Durer, Nuremberg, 'Madonna with the Siskin.' In this painting the infant holds a flour-ball in his hand. Hans Bergmaier, sixteenth century painter, also depicted rickets.

"Among the Netherlands painters are Bruges Master, 1440, 'Adoration of the Magi,' Bruges Museum; 1440, Rogier Van Der Weyden, Brussels, 'St. Luke Painting the Madonna,' Alte Pinakothek, Munich; 1490, Dirk Bouts, Harlem, 'Virgin and Child,' National Gallery, London."

"If one accepts the now well proved hypothesis," Dr. Foote con-



THIS YOUNG AMERICAN'S bulging forehead and protuberant tummy are symptoms of rickets

tinued, "that rickets is a disease of mineral metabolism caused by a lack of certain substances in the diet or by a lack of sufficient sunshine, especially in industrial cities in northern countries, and that war, famine and disease predispose populations to its ravages, one is postulating conditions some of which have occurred over and over again throughout the world, among both civilized and uncivilized peoples in various periods of history.

"When one considers the conditions enumerated in connection with the historical proof of their prevalence in past times, one sees no reason why rickets should not have existed before 1650, and one may be certain that it did so exist and has existed, perhaps from the beginning of time."

The Washington specialist believes that in all probability babies in the tribes of northern Indians suffered from the disease just as their small fellow contemporaries on the other side of the globe did; but mound burial, such as was customary among Indians of the north, is not kind to cartilaginous bone and evidence is not abundant.

The bones by which doctors make a diagnosis of the ills of past ages that have survived the ravages of time are mostly the more completely ossified skeletons of adults. The softer bones of infants and young children disintegrate too readily to have come down to us in great numbers.

There is, however, in the U. S. Army Medical Museum, a skull of an Inca Child of about five years who lived in the temperate highlands of Peru at least a hundred years before Columbus came to this continent. This relic shows (Turn to page 165)

Contra Astrologos

Philosophy

ST. AUGUSTINE, in *Confessions* (Pilkington translation) (Boni and Liveright):

These impostors, then, whom they designate Mathematicians [Astrologers], I consulted without hesitation, because they used no sacrifices, and invoked the aid of no spirit for their divinations, which art Christian and true piety fitly rejects and condemns. . . . There was in those days a wise man, very skilful in medicine, and much renowned therein. . . . When I had become more familiar with him, and hung assiduously and fixedly on his conversation (for though couched in simple language, it was replete with vivacity, life and earnestness), when he had perceived from my discourse that I was given to books of the horoscope-casters, he, in a kind and fatherly manner, advised me to throw them away, and not vainly bestow the care and labour necessary for useful things upon these vanities; saying that he himself in his earlier years had studied that art with a view to gaining his living by following it as a profession, and that, as he had understood Hippocrates, he would soon have understood this, and yet he had given it up, and followed medicine, for no other reason than that he discovered it to be utterly false, and he, being a man of character, would not gain his living by beguiling people. "But thou," said he, "who hast rhetoric to support thyself by, so that thou followest this of free will, not of necessity—all the more, then, oughtest thou to give me credit herein, who labored to attain it so perfectly, as I wished to gain my living by it alone." When I asked him to account for so many true things being foretold by it, he answered me (as he could) "that the force of chance, diffused throughout the whole order of nature, brought this about. For if when a man by accident opens the leaves of some poet, who sang and intended something far different, a verse oftentimes fell out wondrously apposite to the present business, it were not to be wondered at," he continued, "if out of the soul of man, by some higher instinct, not knowing what goes on within itself, an answer should be given by chance, not art, which should coincide with the business and actions of the question."

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Death rates from heart disease, pneumonia, cancer, tuberculosis, and diabetes were all higher in 1926 than in 1925, government figures show.

Corn Borer in Russia

Entomology

The European corn borer, on which the United States is now waging costly war, is an old and troublesome story in Russia. It is a pest throughout the southern half of European Russia, and occurs in less destructive numbers in an additional stretch of territory to the north. Its northernmost extension carries it to the latitude of the Gulf of Finland, which is as far north as Hudson Bay in the western hemisphere. At this latitude in Russia it is not counted especially bad, but serious outbreaks occur in the new Baltic nations, formerly a part of the old Empire.

The borer plague is felt especially in the South, where the cornfields of Russia merge with those of Roumania, and swing eastward across the shores of the Black Sea and up the great river valleys. In the eastern part of the south Russian grain belt corn gives way to millet, which is better adapted to the drier steppes; but the borer afflicts the millet as well as the corn, and efforts are now being made to find varieties less susceptible to its attack.

Russia has no measures against the pest that have not already been recommended in the United States. The best means are the most laborious: a thorough clean-up and burning of all stalks that are not fed to cattle. The burning must be thorough, too, for according to A. Dobrodeyev, a well-known agricultural scientist, borers have often been seen emerging from stalks that were charred black on the outside, apparently none the worse for the experience. He has also seen borers coming out of stalks that had been left lying about in farm yards after the feeding of cattle, although these had been tramped about for weeks in snow and frozen mud.

The great increase in corn borer infestation in Russia seems to have taken place shortly before the World War. In 1908 a 20 per cent. infestation was observed in the fields of the Government (State) of Ekaterinoslav. This initial infestation took approximately an additional 20 per cent. of the stalks in each of the following years, until by 1912 practically every stalk in the afflicted fields had its borers.

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Rickets in Art—Continued



DR. JOHN A. FOOTE, who has found evidence of rickets in the babies painted by old masters

under expert inspection indubitable evidence of rickets.

An arm bone of a pre-Columbian Indian youth that was dug up from a mound in Kentucky reposes in the same collection. It is curved to the point of deformity and demonstrates that there was at least one aborigine that could have done with tasty doses of cod liver oil during his papoosehood.

The practice of wrapping babies up in swaddling clothes, followed by practically all ancient peoples except the Egyptians and Spartan Greeks, is in itself evidence of the prevalence of this so-called modern disease in antiquity, according to Dr. Foote. Ancient physicians whose writings have come down to us, frankly admit that swaddling was done for the purpose of keeping the new-born infant's legs straight, thereby indicating that bowlegged boys and girls have been all too common among the nations of early Europe. Solanus of Ephesus, a well known medico of the second century A. D. declares: "Since swaddling is an important reinforcement and a preventive of deformities, it is best not to free the infant from its protection until the body has become strong enough to remove all fear of the appearance of irregularities of form. The infant's feet may become crooked from unwise attempts at walking. Frequent examples of such deformity are seen in Rome, due in (Turn to next page)

Sunspots and Radio

Physics

Future radio engineers may be able to look at the sun through a telescope and then tell how the presence or absence of spots will affect the transmission of radio waves, as a result of an investigation now under way in Cambridge, Mass., with the cooperation of physicists and astronomers.

There has just been installed in the Harvard Astronomical Laboratory, under the direction of Dr. Harlan T. Stetson, professor of astronomy at Harvard, apparatus to study the relation of spots and radio. Greenleaf W. Pickard, Boston radio engineer, designed the apparatus and installed it for use in cooperation with studies to give the size and number of spots.

It is not yet possible to say whether or not combination of radio data with observation of the sun can ever be used to predict earthly weather conditions, said Dr. Stetson. "However," he said, "observations are beginning to make us feel confident that there is a direct connection between conditions in the solar atmosphere and certain atmospheric disturbances on the earth. It seems not unlikely that with the further study of the bearing of sunspots upon radio reception it will be possible to make allowances for the solar disturbances, and by so doing discover more closely than ever before the correlation of radio reception with temperature, pressure and other meteorological phenomena.

"Just what happens on the earth when a sunspot appears on the side of the sun towards us is not fully known. It is believed that electrified particles discharged from the disturbed region on the sun, hurling through space, bombard the upper atmosphere of the earth and are responsible for an increased ionization of the latter, which is responsible for the modification of the intensity of the radio waves."

The station from which the signals will be sent, which are measured at the Harvard Laboratory, is WBBM, Chicago. The apparatus, which automatically records signal strength, as received in Cambridge, is carefully calibrated each day and makes it possible to record the measurement in absolute units of electrical intensity.

Dr. Stetson explained the apparatus was so designed that it would measure the intensity of the carrier wave and would scarcely be affected at all by superimposed modulations caused by the broadcasting of music.

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Oriental Institute Communica-
tions Number 3

FIRST REPORT OF THE PREHISTORIC SURVEY EXPEDITION

By K. S. SANDFORD and
W. J. ARKELL

This survey of the geology of the Nile is a first effort to rediscover those chapters of the history of man in Egypt which are missing from the written records. The study of prehistoric man has been steadily advancing in Europe for two generations past but only slight progress in such studies has been made in the Nile Valley.

These findings, as well as the other discoveries made in this region, have a direct bearing on the work of archeologists, who can, with this geological information, carry their explorations to a greater degree of exactitude.

\$1.00, postpaid \$1.10

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Limitations of Physics

Physics
BERTRAND RUSSELL, in *Philosophy*
(Norton):

It is chiefly through ideas derived from sight that physicists have been led to the modern conception of the atom as a centre from which radiations travel. We do not know what happens in the centre. The idea that there is a little hard lump there, which is the electron or proton, is an illegitimate intrusion of common-sense notions derived from touch. For aught we know, the atom may consist entirely of the radiations which come out of it. It is useless to argue that radiations cannot come out of nothing. We know that they come, and they do not become any more really intelligible by being supposed to come out of a little lump.

Modern physics, therefore, reduces matter to a set of events which proceed outward from a centre. If there is something further in the centre itself, we cannot know about it, and it is irrelevant to physics.

Physics is mathematical, not because we know so much about the physical world, but because we know so little: it is only its mathematical properties that we can discover. For the rest, our knowledge is negative.

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Rickets in Art—Continued

most cases to ignorance and improper care of the infant. City women devote much less time and care to their infants than those in the rural districts, hence the more frequent occurrence of these deformities among the infants of city dwellers."

Solicitous modern mothers who pour the daily ration of cod liver oil into their protesting offspring regardless of kicks and howls, will regard with interest the dig at the parental carelessness of the ancient Roman ladies.

The art of the Greeks and Romans shows little evidence of rickets probably for two reasons: first, because their artists were idealistic rather than realistic and represented in their statues and paintings only idealized forms of gods and royalty; and second because they lived in the warm countries of the south of Europe, where the small amount of clothing people wore left their bodies exposed to the anti-rachitic action of the sun.

It is interesting to note the criticism of Solanus of Ephesus in this connection. It has been conjectured that children of the upper classes living in Italy and Greece may have been subject to the deformities of rickets because they were brought up in seclusion in the marble courtyards of their patrician parents where they were free from the contaminating influence of *hoi polloi* and incidentally from the beneficent action of sunlight.

The husky peasant *bambini* running naked on the warm slopes of Italy could have had little to fear from the deforming after-effects of rickets.

The up-to-date female parent, brandishing her cod liver oil bottle, will probably say that the old Greek physicians were only following the common custom of trying to blame it all on the women anyway.

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Out of 90,000 fatal accidents in this country, almost 22 per cent. occurred to children under 14 years of age.

Russian citizens are being given gas masks and taught how to use them, for protection against war gas or other emergencies.

Radio stations in 25 states will help to spread information to farmers on ways and means of fighting the European corn borer.

Medical Astronomy

History of Sciences

WALTER CLYDE CURRY, in *Chaucer and the Mediæval Sciences* (Oxford Press):

But undoubtedly John of Burgundy would have applauded the union of theory and practice in Chaucer's Doctor, against whom his strictures upon certain improperly equipped practitioners in the time of the pestilences could not have been leveled. "Ther have bene many grete maistirs," complains John of Burgundy, "and ferre lernyd in theorie or speculation and groundly in sight of medecyne, but they bene litill proued in practik and therto allefully ignorant in the sience of Astronomy, the which science is in phisik wonder nedefull . . . for why astronomye and phisik rectifien yche other in effect and also that one science sheweth forthe many thynges hidde in the other. . . . And I 40 yere and more have oftyn tymes proued in practise that a medecyn gyven contrary to the constellation all thogh hit were both wele compownyd or medled and ordynatly wrought after the science of phisik yet it wrought nowther aftur the purpose of the worcher nor to the profite of the pacient. . . . Wherefore they that have not dronkyn of that swete drynke of Astronomie mowe putte to thise pestilentiall sores no perfit remedie, for bicause that they knowe not the cause and the qualite of the siknesse they may not hele it. . . . He that knowith not the cause hit is onpossible that he hele the sikenes. The comentour also *super secundum phisicorum* seith thus: A man knowith not a thing but if he knowe the cause both ferre and nygh. Sithen therfor the heavenly or firmamentall bodies bene of the first and primytif causes, it is behovefull to have knowlechyng of hem; for yi the first and primytif causes be onknownen, we may not come to know the causes secondary. Sithen therfor the first cause bryngeth in more plentifulously his effectte than doth the cause secondary . . . therfor it shewith wele that without Astronomy litill vayleth phisik, for many man is perished in defawte of his counceleur." Indeed, a knowledge of astronomy is so absolutely essential in medical practice that Hippocrates is credited with having said, "The medical man, whatever else he may be, cannot be considered a perfect physician if he is ignorant of astronomy; no man ought to commit himself into his hands."

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Shamrocks and Serpents

Natural History

The little green trefoil that shines on the lapel of every proud son of old Ireland today is one of the world's standing botanical riddles. Everybody knows and loves the shamrock, but nobody knows quite for sure just what a shamrock is. Send three Irishmen out into the Irish fields for shamrocks, and they might very easily bring back three entirely different plants.

The plant most commonly regarded as the shamrock is the ordinary white clover, which by an international perversity of nomenclature is often called the Dutch clover. In most parts of Ireland this white clover grows even more luxuriantly than it does in this country, because of the mild, moist, Gulf Stream climate.

But a second clover disputes the honor. This is the so-called black clover or nonesuch, also very abundant in Ireland. Its leaves are smaller and narrower than those of the white clover, and its flowers mark it as a relative of the sweet clovers and alfalfa.

The third claimant for recognition as the true shamrock is not a clover at all, though it has a trifoliate leaf. This is the wood sorrel, or oxalis. Like its two rivals, the oxalis grows in many other parts of the world besides Ireland, but finds the climate of that favored island very much to its liking. Perhaps because of its sharp, sour taste, the oxalis used to have wide use in folk-medicine, and some of the ancient herbals attributed almost miraculous curative powers to it.

The whole difficulty seems to have arisen out of the nomenclatural methods of ancient and medieval herbalists, who named plants not according to their flower-structure, as modern botanists do, but rather according to their leaves. They classified such unlike things as holly and live-oaks together, because both trees have hard, thick leaves. Thus any plant with a clover-like trifoliate leaf would be called a "three-leaf," which in ancient Erse is "seamrog," or modern "shamrock."

Though long celebrated as an Eden without a serpent, Erin cannot show absolute absence of snakes, according to Dr. Raymond L. Ditmars, of the New York Zoological Park.

"We have what appear to be actual records of the occasional occurrence of the common grass snake there," he says. "This snake is quite abundant in England, Scotland and continental Europe. It is a perfectly harmless species, which seldom grows more than 2½ feet in length, is grayish green in coloration, with a patch of yellow on each side of the head. Observers have told us that they have seen these snakes in the lake regions of Ireland, but that they are rare."

"The common viper, which is found over the greater part of England, Scotland and continental Europe, and is poisonous, does not appear to occur in Ireland. I have never heard of a record of its being found there."

The legend that St. Patrick drove the snakes out of Ireland seems to have arisen partly as an allegory of

his missionary activities in banishing the old pagan myths, and perhaps partly because of the natural tendency of peoples to embroider the real accomplishments of their heroes with still greater imaginary feats.

The probabilities are that the force that sent the snakes out of Ireland, never to return, was a hundred thousand years older than St. Patrick. Some paleontologists have conjectured that during the ice ages the climate of Ireland must have been much colder than it now is, perhaps more or less like that of the snakeless Iceland of today. And since Ireland has been geographically separated from England by a broad salt-water channel ever since the close of the ice age, no serpents have had a chance to migrate thither. The few grass snakes mentioned by Dr. Ditmars may be descendants of survivors of the glacial crisis, or may possibly have been carried into Ireland among the roots of transplanted bushes or trees, or in earth and stones used as ships' ballast.

One other island in the world can boast with Ireland of a complete freedom from venomous snakes. This is Madagascar, off the east coast of Africa. The absence of poisonous serpents in Madagascar is the more remarkable in that the African mainland swarms with them. But the fauna and flora of this equatorial Ireland are remarkable in many respects, and the island bears evidence of having been separated from the mainland for many ages, if indeed it was ever united to it.

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Flu Epidemic Unlikely

Medicine

The probabilities that the influenza epidemic now ravaging Japan will afflict this country are not great, in the estimation of public health officials. Until this disease appeared in Japan the world in recent months had been comparatively free from it. The epidemic is expected to die out with the coming of spring and the warmer weather that checks the respiratory diseases.

Fall and winter are the influenza seasons and, unless this tricky disease takes a new turn, health specialists consider a spring and summer epidemic unlikely. As the spring is now further advanced in Japan than in this country, reports of the subsidence of the epidemic are expected shortly.

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Voice Prints

Criminology

"Voice prints" are to be made of criminals by various police departments of the Southwest. The innovation was suggested by Charles Gunning, Chief of Detectives of Dallas. Detectives claim a phonographic record of a criminal's voice may be made while the man is engaged in an ordinary conversation and without his knowledge. The peculiarities of the man's voice often give policemen clues by which an unknown criminal may be identified.

When a library of voice records has been completed it will be possible for the victim of a hold-up to sit in a comfortable chair and listen to the voices of numerous suspected robbers in an attempt to identify the person who said "stick 'em up" to him.

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Melons Ripened with Gas

Botany

Casaba and honey-dew melons have been added to the list of fruits which can be given the color and texture of ripeness by treatment with ethylene gas, as a result of researches carried on by Dr. J. T. Rosa at the University Farm at Davis, Calif. Partly ripe melons, with rinds still green and flesh still hard, were subjected to the gas at a concentration of one part in 4,000. They assumed the orthodox "ripe" color, and their flesh became soft. The sugar content, however, was not raised by the treatment. For this reason the hastening gas treatment is not recommended for fruits picked before a fairly advanced stage of maturity.

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A Common Benefactor

Medicine

[“Baltimore, Jan. 10.—It was announced today that a gift of \$195,000 (£39,000) had been made to the Johns Hopkins University here for the study of ‘the origin, nature and possible cure of the common cold’.”—*Punch*.]

High praise to science we accord
For knowing how to ease
The pains of people who are flooded
By a first-class disease;
Nor do we grudge our leech the fee
That in his pocket jingles
When his attentions set us free
From gout, pneumonia, pleurisy,
Clergyman's throat or shingles.

But all researches, new or old,
Into the cause and cure
Of just the common vulgar cold
Have left the thing obscure;
And none can teach us, though the
quacks
Purvey their patent wheezes,
To dodge a plain catarrh's attacks,
Inducing shivers down our backs
With intermittent sneezes.

Cynics, of course, will say that those
Who undertook the quest
Of remedies for running nose
Have never tried their best;
For, if they ever hit upon
The means to make a fellow
Immune when winter's worst
comes on,
Their occupation would be gone,
Like that of poor *Othello*.

But lo! from Transatlantic parts
Great tidings we have heard
That promise cheer to chilly hearts
Long sick with dope deferred;
Those dirty germs will soon be
downed
Under a rude corrective,
Now a philanthropist has found
Something like forty-thousand pound
With that humane objective.

For Mr. Coolidge our regard
Can surely never cease
While he is building cruisers hard
To push the cause of Peace;
But he that aims at killing dead
The common cold—we must exalt
him o'er
Even the Presidential head,
This gentleman of whom we've read
Such balmy news from Baltimore.

O. S.

Science News-Letter, March 17, 1928

The New Atomic Theory

Physics

BERTRAND RUSSELL, in *Philosophy* (Norton):

The newer theory has been put forward mainly by two physicists, Heisenberg and Schrödinger, in forms which look different, but are in fact mathematically equivalent. It is as yet an impossible task to describe this theory in simple language, but something can be said to show its philosophical bearing. Broadly speaking, it describes the atom by means of the radiations that come out of it. In Bohr's theory, the planetary electrons are supposed to describe orbits over and over again while the atom is not radiating; in the newer theory, we say nothing at all as to what happens at these times. The aim is to confine the theory to what is empirically verifiable, namely radiations; as to what there is where the radiations come from, we cannot tell, and it is scientifically unnecessary to speculate. The theory requires modifications in our conception of space, of a sort not yet quite clear. It also has the consequence that we cannot identify an electron at one time with an electron at another, if in the interval, the atom has radiated energy. The electron ceases altogether to have the properties of a “thing” as conceived by common sense; it is merely a region from which energy may radiate.

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The main point for the philosopher in the modern theory is the disappearance of matter as a “thing.” It has been replaced by emanations from a locality—the sort of influences that characterize haunted rooms in ghost stories. . . . The theory of relativity leads to a similar destruction of the solidity of matter, by a different line of argument. All sorts of events happen in the physical world, but tables and chairs, the sun and moon, and even our daily bread, have become pale abstractions, mere laws exhibited in the successions of events which radiate from certain regions.

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One of the United States Army's Fokker tri-motor monoplanes has been rigged up as a flying laboratory for testing of instruments, radio, and other equipment.

Botanists are seeking a promising seedless persimmon to develop for an orchard fruit.

Different races have characteristic types of fingerprints, an investigation indicates.

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CLASSICS OF SCIENCE:

Laws of Heredity

Biology
PART ONE



GREGOR MENDEL

The season for planting is here, and those who wish to repeat Mendel's experiments may follow his procedure given in this extract from his original report. You can obtain from any seedsman the six kinds of peas—smooth, wrinkled, green, yellow, tall and dwarf—necessary to carry out the experiments.

EXPERIMENTS IN PLANT-HYBRIDIZATION, by George Mendel, 1865; translation made for the Royal Horticultural Society and reprinted as an appendix to Mendel's *Principles of Heredity*, by William Bateson, M.A., F.R.S., V.M.H., Cambridge (England) 1909.

The Experimental Plants

The value and utility of any experiment are determined by the fitness of the material to the purpose for which it is used, and thus in the case before us it cannot be immaterial what plants are subjected to experiment and in what manner such experiments are conducted.

The selection of the plant group which shall serve for experiments of this kind must be made with all possible care if it be desired to avoid from the outset every risk of questionable results.

The experimental plants must necessarily—

1. Possess constant differentiating characters.
2. The hybrids of such plants must, during the flowering period, be protected from the influence of all foreign pollen, or be easily capable of such protection.

The hybrids and their offspring should suffer no marked disturbance in their fertility in the successive generations.

Accidental impregnation by foreign pollen, if it occurred during the experiments and were not recognized, would lead to entirely erroneous conclusions. Reduced fertility or entire sterility of certain forms, such as occurs in the offspring of many hybrids, would render the experiments very difficult or entirely frustrate them. In order to discover the relations in which the hybrid forms stand towards each other and also towards their progenitors it appears to be necessary that all members of the series developed in each successive generation should be, *without exception*, subjected to observation.

At the very outset special attention was devoted to the *Leguminosae* on account of their peculiar floral structure. Experiments which were made with several members of this family led to the result that the genus *Pisum* was found to possess the necessary qualifications.

Some thoroughly distinct forms of this genus possess characters which are constant, and easily and certainly recognizable, and when their hybrids are mutually crossed they yield perfectly fertile progeny. Furthermore, a disturbance through foreign pollen cannot easily occur, since the fertilising organs are closely packed inside the keel and the anther bursts within the bud, so that the stigma becomes covered with pollen even before the flower opens. This circumstance is of especial importance. As additional advantages worth mentioning, there may be cited the easy culture of these plants in the open ground and in pots, and also their relatively short period of growth. Artificial fertilization is certainly a somewhat elaborate process, but nearly always succeeds. For this purpose the bud is opened before it is perfectly developed, the keel is removed and each stamen carefully extracted by means of forceps, after which the stigma can at once be dusted over with foreign pollen.

In all, thirty-four more or less distinct varieties of Peas were obtained from several seedsmen and subjected to a two years' trial. In the case of one variety there noticed, among a larger number of plants all alike, a few forms which were markedly different. These, however, did not vary in the following year, and agreed entirely with another variety obtained from the same seedsman; the seeds were therefore doubtless merely accidentally mixed. All the other varieties

yielded perfectly constant and similar offspring; at any rate, no essential difference was observed during two trial years. For fertilisation twenty-two of these were selected and cultivated during the whole period of the experiments. They remained constant without any exception.

Their systematic classification is difficult and uncertain. If we adopt the strictest definition of a species, according to which only those individuals belong to a species which under precisely the same circumstances display precisely similar characters, no two of these varieties could be referred to one species. According to the opinion of experts, however, the majority belong to the species *Pisum sativum*; while the rest are regarded and classed, some as subspecies of *P. sativum*, and some as independent species, such as *P. quadratum*, *P. saccharatum*, and *P. umbellatum*. The positions, however, which may be assigned to them in a classificatory system are quite immaterial for the purposes of the experiments in question. It has so far been found to be just as impossible to draw a sharp line between the hybrids of species and varieties as between species and varieties themselves.

Arrangement of Experiments

If two plants which differ constantly in one or several characters be crossed, numerous experiments have demonstrated that the common characters, on the other hand, unite in the hybrid to form a new character, which in the progeny of the hybrid is usually variable. The object of the experiment was to observe these variations in the case of each pair of differentiating characters, and to deduce the law according to which they appear in the successive generations. The experiment resolves itself therefore into just as many separate experiments as there are constantly differentiating characters presented in the experimental plants.

The various forms of Peas selected for crossing showed differences in the length and color of the stem; in the size and form of the leaves; in the position, color, and size of the flowers; in the length of the flower stalk; in the color, form, and size of the pods; in the form and size of the seeds; and in the color of the seed-coats and of the albumen [cotyledons]. Some of the characters noted do not permit of (Just turn the page)

Mendel—Continued

a sharp and certain separation, since the difference is of a "more or less" nature, which is often difficult to define. Such characters could not be utilised for the separate experiments; these could only be applied to characters which stand out clearly and definitely in the plants. Lastly, the result must show whether they, in their entirety, observe a regular behavior in their hybrid unions, and whether from these facts any conclusion can be come to regarding those characters which possess a subordinate significance in the type.

The characters which were selected for experiment relate:

1. To the difference in the form of the ripe seeds. These are either round or roundish, the depressions, if any, occur on the surface, being always only shallow; or they are irregularly angular and deeply wrinkled (*P. quadratum*).

2. To the difference in the colour of the seed albumen (endosperm). The albumen of the ripe seeds is either pale yellow, bright yellow and orange coloured, or it possesses a more or less intense green tint. This difference of colour is easily seen in the seeds as [= if] their coats are transparent.

3. To the difference in the colour of the seed-coat. This is either white, with which character white flowers are constantly correlated; or it is grey, grey-brown, leather-brown, with or without violet spotting, in which case the colour of the standards is violet, that of the wings purple; and the stem in the axils of the leaves is of a reddish tint. The grey seed-coats become dark brown in boiling water.

4. To the difference in the form of the ripe pods. These are either simply inflated, not contracted in places; or they are deeply constricted between the seeds and more or less wrinkled (*P. saccharatum*).

5. To the difference in the colour of the unripe pods. They are either light to dark green, or vividly yellow, in which colouring the stalks, leaf-veins, and calyx participate.

6. To the difference in the position of the flowers. They are either axial, that is, distributed along the main stem; or they are terminal, that is, bunched at the top of the stem and arranged almost in a false umbel; in this case the upper part of the stem is more or less widened in section (*P. umbellatum*).

7. To the difference in the length of the stem. The length of the stem is very various in some forms; it is, however, a constant character for

each, in so far that healthy plants, grown in the same soil, are only subject to unimportant variations in this character.

In experiments with this character, in order to be able to discriminate with certainty, the long axis of 6 to 7 ft. was always crossed with the short one of $\frac{3}{4}$ ft. to $1\frac{1}{2}$ ft.

Forms of Hybrids

Experiments which in previous years were made with ornamental plants have already afforded evidence that the hybrids, as a rule, are not exactly intermediate between the parental species. With some of the more striking characters, those, for instance, which relate to the form and size of the leaves, the pubescence of the several parts, &c., the intermediate, indeed, is nearly always to be seen; in other cases, however, one of the two parental characters is so preponderant that it is difficult, or quite impossible, to detect the other in the hybrid.

This is precisely the case with the Pea hybrids. In the case of each of the seven crosses the hybrid-character resembles that of one of the parental forms so closely that the other either escapes observation completely or cannot be detected with certainty. This circumstance is of great importance in the determination and classification of the forms under which the offspring of the hybrids appear. Henceforth in this paper those characters which are transmitted entire, or almost unchanged in the hybridisation, and therefore in themselves constitute the characters of the hybrid, are termed the *dominant*, and those which become latent in the process *recessive*. The expression "recessive" has been chosen because the characters thereby designated withdraw or entirely disappear in the hybrids, but nevertheless reappear unchanged in their progeny, as will be demonstrated later on.

It was furthermore shown by the whole of the experiments that it is perfectly immaterial whether the dominant character belongs to the seed-bearer or to the pollen-parent; the form of the hybrid remains identical in both cases. This interesting fact was also emphasised by Gärtner, with the remark that even the most practised expert is not in a position to determine in a hybrid which of the two parental species was the seed or the pollen plant.

Of the differentiating characters which were used in the experiments the following are dominant:

1. The round or roundish form of the seed with or without shallow depressions.

2. The yellow colouring of the seed albumen [cotyledons].

3. The grey, grey-brown, or leather-brown colour of the seed-coat, in association with violet-red blossoms and reddish spots in the leaf axils.

4. The simply inflated form of the pod.

5. The green colouring of the unripe pod in association with the same colour in the stems, the leaf-veins and the calyx.

6. The distribution of the flowers along the stem.

7. The greater length of stem.

With regard to this last character it must be stated that the longer of the two parental stems is usually exceeded by the hybrid, a fact which is possibly only attributable to the greater luxuriance which appears in all parts of plants when stems of very different length are crossed. Thus, for instance, in repeated experiments, stems of 1 ft. and 6 ft. in length yielded without exception hybrids which varied in length between 6 ft. and $7\frac{1}{2}$ ft.

The hybrid seeds in the experiments with seed-coat are often more spotted, and the spots sometimes coalesce into small bluish-violet patches. The spotting also frequently appears even when it is absent as a parental character.

The hybrid forms of the seed-shape and of the albumen [colour] are developed immediately after the artificial fertilisation by the mere influence of the foreign pollen. They can, therefore, be observed even in the first year of experiment, whilst all the other characters naturally only appear in the following year in such plants as have been raised from the crossed seed.

Other extracts of Mendel's laws of heredity will be printed as the Classic of Science in the SCIENCE NEWS-LETTER next week. It will describe the F_1 , F_2 and subsequent generations, and give the general laws for reappearance of the parental and hybrid forms with any number of differentiating characters in the n th generation after crossing. Mendel's biography will appear next week.

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A new electric clock, which tells time by red and white flashes from 16 lamps, has been installed in Baltimore, and can be read 20 miles away if the weather is favorable.

A bridge over the Susquehanna River, in Maryland, is being made double-decked, so that south bound traffic will pass over the ground floor and north bound traffic will use the upper deck.

"Diving God" in Ancient Maya Carving

Archæology

BY EMMA REH STEVENSON

In Mexico, where archæology is not at all a dead thing, the scientist must often cope with the passions of the living as well as with the ruins and relics of the dead.

In the Zapotec village of Zaachila in the valley of Oaxaca, where religious feeling runs high, a number of important prehistoric stone carvings have been found incorporated in a four-century-old Christian church. The position they occupy suggests that they must have been of great importance to the Indians in precolonial times, and the Director of Archæology of the Mexican Department of Public Education is planning to remove them to the city of Oaxaca where their significance may be studied.

The ten-foot doorstep of the church of Santa Maria of Zaachila is a single monolith which still shows the signs of ancient carvings in spite of the wear and tear of four centuries of footsteps. But a smaller slab, apparently of much harder stone, has resisted the years much better and shows beautiful carvings of a style that indicates strong Maya influence. This slab is the first stone of the floor just inside of the doorstep.

T. B. Vaccine Honors

Medicine

The grand cross, highest rank of the Legion of Honor, has been conferred on Dr. Albert Calmette of the Pasteur Institute, who developed a preventive vaccine treatment for tuberculosis. His collaborator, Dr. C. Guérin, was given the rank of officer of the distinguished order.

Some 52,772 children have been vaccinated at birth in Paris and the provinces since July 1, 1924, when the vaccine was first put at the disposal of physicians, Dr. Calmette told members of the Academy of Medicine. Cards of 5,749 vaccinated infants born in tuberculous surroundings are kept in the Pasteur Institute files for record and observation. Infants in the group under one year of age present a mortality of 3.1 per cent. while that of unvaccinated children is 8.5 per cent. The general mortality has been reduced more than half. Among the vaccinated children who have reached ages of from two to three and a half years, the tuberculosis deaths have been practically nil. The vaccine is administered at birth and a second dose seems to be unnecessary.

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It is divided into three segments framed by grooved lines. The first segment represents a god similar to the famous Maya "Diving God" so-called because he is always found in the act of descending from heaven in a jack-knife dive. In the case of the Zaachila stone, the god appears to be dropping from a sort of a vault which looks like a symbolized upper jaw with all its teeth. The god wears plumes in his hair and the "language sign" comes from his mouth. He has with him his "penache," the label by which one who is skilled in reading the Maya sign language could tell his name. A necklace hangs from his hands, and is probably meant to represent the well-known collars of jadeite pebbles so popular with ancient Zapotecs and Mixtecs, and for which Oaxaca is famous.

Receiving the god on the ground below, seated crosslegged on either side and facing the center, are two other human figures, probably beating drums, and wearing curious crownlike headgear. They are not dressed alike, in spite of their symmetrical position, and they may represent different sexes. The language sign also comes from their mouths.

The second and third segments of the slabs are similar to the first, except that the figure of the Diving God is found only in the latter. The figures are likewise seated crosslegged, the soles of their feet turned out, and they are occupied with drum-shaped objects. The spaces are filled with scrolls whose meaning has not been studied.

The faces of some of the seated figures are completely obliterated, while others are only partly destroyed so that faces are concavities. At first appearance it might seem that the position of the slab at the first step down from the threshold explains the destruction, but on reconsideration it is evident that if it were only the natural wear of feet, the destruction would be uniform and not just in spots.

The fact that the slab is laid down on the most stepped-on place on the floor makes it appear deliberate, and it was probably done to demonstrate to the early Indian converts the impotency of their native gods. In the National Museum at Mexico City there are a number of wooden "huehueltls," ancient drums used by the Indians, carved (*Turn to next page*)

Chicken Pox and Measles Serum

Medicine

Chicken pox may be added to the list of diseases that can be prevented by vaccination.

Dr. Jean V. Cooke of the Washington University School of Medicine at St. Louis, Mo., has reported to the American College of Physicians that inoculation of exposed children with serum from convalescent patients has successfully prevented cases of both chicken pox and measles.

Though the former disease is sufficiently mild as not to require general protective measures, its appearance in epidemics in institutions causes considerable difficulty, especially in the very young children affected. Of a total of 369 cases of exposed children, vaccinated for chicken pox described in medical literature, Dr. Cooke declared, only 74, or 20 per cent., developed chicken pox. Of 206 unvaccinated exposed children observed as controls, 158, or 77 per cent., contracted the disease. Such

immunity is temporary but serves to protect orphanages and schools from the inconvenience of an epidemic.

The preventive treatment for measles, said Dr. Cooke, should be concentrated on account of the danger of complications on infants and young children under five years of age. Results with this method show, he stated, that almost 90 per cent. of children given convalescents' serum during the first week after exposure fail to develop the disease.

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Belgian Research

General Science

Belgium, taking advantage of its industrial prosperity, is raising a 200,000,000 franc fund (\$5,600,000) for the promotion of scientific research along mechanical and chemical lines, according to information received by the U. S. Department of Commerce. The fund will be administered by the government.

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"Diving God"—*Cont'd.*

in numerous figures of gods and priests, also with their faces scratched out.

The fact that these two stones, the doorstep and the slab on the floor just inside, were singled out for the most stepped-on position in the church, suggests that they were important symbols in the prehistoric religion whose influence the early missionaries attempted to destroy.

The church itself is built near the largest of a number of prehistoric mounds which were probably the substructures of old Zapotec or Mixtec temples, no relics of which now remain. The sites are stripped of even the stones which once faced the sides of the mounds and formed the stairways, and ancient Zaachila was probably used as building material for Colonial Zaachila. High up in the uneven masonry of the old church a broken stone with carved symbols stands out.

The village has about 1,000 inhabitants. It is out of the beaten track and visitors are rare, and the hamlet has probably changed very little in many generations. The church is a

few steps from the market plaza, and the Indian in trouble comes in between barterings for pigs and turkeys or chili, to wait his prayer before the Black Christ on the Crucifix or to the primitively carved and painted saints and madonnas. He kisses the floor in front of the statues, and as he passes out to go back to his fields or to his "puesto" in the market, he gazes curiously, but very hurriedly, at the carved stone slab he no longer understands, which was once perhaps his bible, and which strangers are now going to carry away.

The village is not a friendly place to a tactless visitor and the modern Zapotecs and Mixtecs do not like strange things they do not understand to be done in their church, just as four centuries ago they resented having their original native Indian religion tampered with.

In a church in the town of Oaxaca, not many miles away, there is an historical painting of the conversion in Zaachila in 1521, of Cosijoeza, the last native ruler in the Valley of Oaxaca, who was afterwards known as Don Carlos Cosijoeza, according to the label of the picture. This suggests

that Zaachila might have been an important center of precolonial civilization.

There are other archaeological relics in this village besides the ones in the town church. On another side of the plaza an old colonial house has as part of the street pavement by its doorstep, a large flat stone that bears what is probably a date, according to the Maya system of writing down time. The symbols consist of the conventional Maya bars, dots, and heads. In the back yard of another house nearby is another monolith covered with carvings on two sides, which also appear to be dates. This stone, it is said in the village, once formed the cover of a sepulchre in one of the great earth mounds outside of the village, which formed the substructures of temples in ancient times.

Very few outsiders have seen these stones. They were first reported to the Mexican government by Senor Martin Bazan, federal inspector of archaeology for the State of Oaxaca. They are about to be removed to the museum at the city of Oaxaca.

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The Human Eye

Physiology-Physics

SIR JOHN PARSONS, in *Nature* (London):

As Helmholtz long ago pointed out, the eye shows many defects as an optical instrument. The refracting surfaces are not accurately spherical; they are not accurately centred on the optic axis; they are not completely homogeneous and therefore give rise to irregular astigmatism, or completely transparent; the cornea and the lens are not free from spherical or from chromatic aberration. Hence Helmholtz's oft-repeated dictum that if an optician delivered so faulty an instrument it would be justifiable to return it to the maker. Even Homer sometimes nods, and it is regrettable that Helmholtz should have uttered so unjust a sarcasm. For the true criterion of the eye as an organ of vision is its biological utility, i. e., its capacity to fulfill its manifold functions in the interests of the individual and ultimately of the race. An instrument approximately a sphere of 11 mm. radius, which combines the advantages of being a camera with automatic adjustment from infinity to a distance of 3 or 4 inches and unparalleled range of sensitivity, an efficient photometer, colorimeter, kaleidoscope, stereoscope, and range-finder cannot be regarded as inefficient.

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Do You Know That—

The best climate for man to live in would average 51 degrees in temperature, according to one weather expert.

A few centuries ago, men of science believed that diamonds had sex and reproduced as living creatures do.

Bones of at least 2,000 hippopotami killed by prehistoric hunters were found in a single cave in Sicily.

Only two per cent. of the trees struck by lightning in national forests catch fire, but this causes 17 per cent. of the forest fires.

A number of tropical game birds have been brought to Sapelo Island, Georgia, in an attempt to acclimatize them to the United States.

A slab in the Berlin Museum dating about 2600 B. C., from a temple in Egypt, shows the various processes in smoking honey, putting it in jars, pressing, and sealing it.

Children in Nebraska's public schools are now taking courses in character education, including courtesy, obedience to law, and good citizenship.

A Scientific Civilization

Philosophy

PROF. A. W. MEYER of Stanford, in *Scientific Monthly*:

It has often seemed to me that it will be far more difficult to establish a scientific civilization than a religious one. Belief spreads easily, even when it concerns scientific things. It does not take long to believe that I-On-A-Co cures all ills, but it would take long indeed to prove it! Knowledge comes far slower than belief, for it is the result of individual effort, of toil. It may have been this which caused Stevenson to say that the lamp of science smells terribly of oil, but it frequently is forgotten that he also added that its light shines very brightly.

Science is slow and halting and can not hurry. It must be circumspect. Dogma, being ready-made, is always at hand. It knows none of the impediments of science. Science encourages the suspension of judgment, not the abdication of it. It inculcates a judicial attitude, and by revealing man's place in the world, teaches him humility and that should make for tolerance. It does not, it is true, invariably effect these things, but surely that is not surprising, for the far older humanities, and the still older religions, also have failed to do so. They too could not wholly overcome human frailty.

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Star Seen Changing to Nebula

Astronomy

A star that exploded, and is now changing to a nebula, in reverse of the usual process of stellar evolution, is the rare spectacle being observed at the branch station of the Harvard College Observatory at Bloemfontein, South Africa. This unconventional behavior of nova Pictoris, as the star is called, was discovered by Dr. J. S. Paraskevopoulos, who is in charge of the branch station, Dr. Harlow Shapley, director of the observatory, recently announced. Confirmation of the discovery has just been received from the Argentine National Observatory at LaPlata.

Until the spring of 1925 this star was too faint to be seen with the unaided eye. Then it suddenly flared up as a nova, or "new star," and was discovered by R. Watson, a South African amateur astronomer. The star is in the constellation Pictor, the painter, a group not visible from northern latitudes.

"The evolution of stars," Dr. Shapley explained, "is generally thought to be in the direction from nebula to star, but in this instance, and in two or three others, the transformation is in the opposite direction, and, astronomically speaking, is very rapid. All of these reversed cases are associated with the so-called novae, or new stars.

"Examination of earlier plates in the great collection at the Harvard Observatory, in Cambridge, where

the southern photographs are stored, showed that before its outburst, it had been of the twelfth magnitude, and astronomers believe that it will gradually return to that same degree of faintness.

"Dr. Paraskevopoulos' discovery was based on photographs of the star, made under various conditions, with the rapid photographic telescopes which he has recently transferred from the former Harvard station in Peru to the new site in South Africa. A ring or shell of nebulous matter appeared around the outer edge of the image of the star, and has gradually grown larger and more distinct. The phenomenon clearly indicates that the outburst of the nova, and its rapid increase three years ago to ten thousand times its former brightness, was actually an explosion of the star, which blew its outer parts away from the nucleus.

"The ring of nebulosity now observed is the former outer portion receding with a velocity of several hundred miles a second. Future observations will show whether the explosive transformation will result in one of the permanent and typical 'planetary' nebulae of which a hundred or so are known among the stars, or whether the receding atmosphere will gradually dissipate into space, leaving the nucleus as a typical star.

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Antarctic Ice Would Bury Earth

Geography

Antarctica, whose desolate ice fields will soon re-echo the roar of Commander Byrd's motors, has enough ice to cover the whole earth to a depth of 120 or 130 feet, and has been gathering this solidified cold for a quarter of a million years or more.

This is the opinion of Prof. W. Meinardus of the University of Göttingen, who has been engaged lately in an endeavor to estimate the bulk of the ice that covers the south polar continent. He is of the opinion that only a small part of the elevations of from 6,000 to 10,000 feet reported for the surface of the antarctic plateau can be made up of solid land. Most of the mass, he thinks, consists of accumulated ice, piled on a foundation of rock not more than about 2,000 feet in mean elevation. Professor Meinardus derives this estimated land height of Antarctica from an average of the mean elevations of the nearest

continents, South America, Africa and Australia. All above that is ice.

Multiplying the estimated average thickness of this massive sheet by the area of Antarctica, the German scientist obtains a total of twenty-six quadrillion (26,000,000,000,000,000) cubic yards of ice, weighing about twenty quadrillion tons. There is enough ice there, he says, to cover all Europe to a depth of over 6,500 feet, or to blanket the whole earth under a layer between 120 and 130 feet thick. Melted down, it would raise the world's general ocean level 100 feet.

From the slowness of glacial movements in the antarctic region, Professor Meinardus has come to the conclusion that at least part of the southern ice mass has been there since Pleistocene geological times. This is variously estimated at from 250,000 to 400,000 years ago.

Science News-Letter, March 17, 1928

NATURE RAMBLINGS

BY FRANK THONE

Natural History



Euphorbias

The plants of the Euphorbia family are among the most interesting in the whole vegetable kingdom, and some of them are also among the most important. They are found in all parts of the world, though they favor the drier tropics, and some of them have found wide favor as cultivated ornamentals. The most familiar examples, perhaps, are the poinsettia and the variegated-leaved plant known as snow-upon-the-mountain.

Another favorite for indoor culture is the one known as Glastonbury thorn, technically *Euphorbia splendens*. It has a square, succulent, thorn-armed stem, more or less like a cactus, and it bears crops of oddly-shaped but very beautiful little coral-colored flowers. Tradition has it that after he had buried the crucified Christ in his own tomb, Joseph of Arimathea left Palestine and finally wandered to England. At Glastonbury, which really is one of the oldest of Christian shrines in the kingdom, he thrust his dry staff into the ground, and it took root and bore flowers at Christmastide. At any rate, this desert plant, which is usually almost as leafless as a cactus, really will bear abundant flowers in the winter if well cared for, so that it is also sometimes called Christmas thorn.

Two other members of the family, though not of the genus *Euphorbia*, are of very considerable economic importance. The first is the castor bean, that Tree of Evil for medicine-hating small boys. During the War castor oil found another important use, for it was the best lubricant known at that time for airplane motors. The second euphorbiaceous tree is even more important, both in peace and war, for it is the famous *Hevea brasiliensis*, the Para rubber tree.

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How to Use Index Word Feature

Classification

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key-word in italics is printed under the heading of each article. The key words used fit into any system of classification, whether it be a straight alphabetical file, a system of your own devising, the Library of Congress classification or the Dewey system.

Note that you can clip out any article without fear of damaging another original article in which you might be interested, since editorial matter printed on the right-hand pages is backed by advertising, standing matter, a continuation of the article on the other side, or reprinted quotations.

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The classification of the Library of Congress has come into common use in the libraries of the country owing to the publication by the Government of the card index of all new books. We print below a list of the subject titles which are most used in the *SCIENCE NEWS-LETTER*. The full scheme of classification is contained in "Outline Scheme of Classes," issued by the Library of Congress.

A	General Works. Polygraphy.
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BF	Psychology.
G	Geography, voyages, travel.
GA	Mathematical and astronomical geography.
GB	Physical geography.
GC	Oceanology and oceanography.
GF	Anthropogeography.
GN	Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archaeology.
GR	Folklore.
GT	Manners and customs.
GV	Sports and amusements. Games.
HC	Economic history and conditions. National production.
HD	Economic history. Agriculture and Industries.
HE	Transportation and communication.
HF	Commerce.
HM	Sociology. General.
HQ	Family. Marriage. Woman.
HV	Social pathology.
L	Education.
M	Music.
N	Fine arts.
P	Philology and linguistics.
Q	Science. General.
QA	Mathematics.
QB	Astronomy.
QC	Physics.
QD	Chemistry.
QE	Geology.
QH	Natural history.
QK	Botany.
QL	Zoology.
QM	Human anatomy.
OP	Physiology.
OR	Bacteriology.
R	Medicine. General.
S	Agriculture. General.

SB	Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD	Forestry.
SF	Animal culture. Veterinary medicine.
SH	Fish culture and fisheries.
SK	Hunting. Game protection.
T	Technology. General.
TA	Engineering. General.
TC	Hydraulic engineering.
TD	Sanitary and municipal engineering.
TE	Roads and pavements.
TF	Railroads.
TG	Bridges and roofs.
TH	Building construction.
TJ	Mechanical engineering.
TK	Electrical engineering and industries.
TL	Motor vehicles. Cycles. Aeronautics.
TN	Mineral industries. Mining and Metallurgy.
TP	Chemical technology.
TR	Photography.
TS	Manufactures.
TT	Trades.
TX	Domestic science.
U	Military science. General.
V	Naval science. General.

Dewey Classification

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020	Library economy
030	General cyclopedias
040	General collected essays
050	General periodicals
060	General societies
070	Newspapers
080	Special libraries. Polygraphy
090	Book rarities
100	PHILOSOPHY—
110	Metaphysics
120	Special metaphysical topics
130	Mind and body
140	Philosophical systems
150	Mental faculties. Psychology
160	Logic
170	Ethics
180	Ancient philosophers
190	Modern philosophers
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210	Natural theology
220	Bible
230	Doctrinal. Dogmatics. Theology
240	Devotional. Practical
250	Homiletic. Pastoral. Parochial
260	Church. Institutions. Work
270	Religious history
280	Christian churches and sects
290	Ethnic. Non-Christian
300	SOCIOLOGY—
310	Statistics
320	Political science
330	Political economy
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390	Customs. Costumes. Folklore
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430	German
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460	Spanish
470	Latin
480	Greek
490	Minor Languages
500	NATURAL SCIENCE—
510	Mathematics
520	Astronomy
530	Physics
540	Chemistry
550	Geology
560	Paleontology
570	Biology
580	Botany
590	Zoology
600	USEFUL ARTS—
610	Medicine
620	Engineering
630	Agriculture
640	Domestic economy
650	Communication. Commerce
660	Chemical technology
670	Manufactures
680	Mechanic trades
690	Building
700	FINE ARTS—
710	Landscape gardening
720	Architecture
730	Sculpture
740	Drawing. Decoration. Design
750	Painting
760	Engraving
770	Photography
780	Music
790	Amusement
800	LITERATURE—
810	American
820	English
830	German
840	French
850	Italian
860	Spanish
870	Latin
880	Greek
890	Minor languages
900	HISTORY—
910	Geography and travels
920	Biography
930	Ancient history
	Modern
940	Europe
950	Asia
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970	North America
980	South America
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PHYSIOLOGY—V. H. Mottram—Norton (\$3). A straightforwardly written textbook of human physiology. An even hundred of its 264 pages of text are devoted to the nervous system, with an additional chapter on the hormones; the book will be especially valuable, therefore, to students who are preparing for courses in psychology.

Physiology
Science News-Letter, March 17, 1928

THE SKIN—Albert Strickler—Appleton (\$1.50). A small, concisely and simply written book that gives valuable information on the skin, including the hair and scalp, and how to take care of it.

Hygiene
Science News-Letter, March 17, 1928

FUNDAMENTALS OF DAIRY SCIENCE—Associates of Lore A. Rogers—Chemical Catalog (\$5.50). A most excellent book for its field; thoroughgoing but not too detailed, covering all necessary points and giving concisely all necessary information. It automatically becomes indispensable for the libraries of agricultural colleges, experiment stations, chemistry and bacteriology departments, and fully trained practical dairy farmers.

Agriculture
Science News-Letter, March 17, 1928

THE GARDEN LOVER—L. H. Bailey—Macmillan (\$1.50). Another of the discursive, mellow little books with which Dr. Bailey has lately been delighting horticulturists and botanists and folk in general who like the smell of new-turned earth and the green of new leaves.

Horticulture
Science News-Letter, March 17, 1928

THE ANNUALS OF FLOWERLAND—Alice T. A. Quackenbush—Macmillan (\$1.50). Condensed botanical information, interspersed with anecdotes from the history of horticulture.

Horticulture
Science News-Letter, March 17, 1928

THE CHARM OF BIRDS—Viscount Grey of Fallodon—Stokes. Showing that it is still possible to be a gentleman and a statesman and a scholar all in the same lifetime.

Ornithology
Science News-Letter, March 17, 1928

THE PHEASANTS—Louise Connolly—Newark Museum. A bright and chattily written popular account of three new pheasant exhibits in the Newark Museum.

Ornithology
Science News-Letter, March 17, 1928

THE DREAMS OF YOUTH—Walter Amos Morgan—Century (\$2).

It takes a high and unusual kind of genius to be able to talk acceptably for children. Dr. Morgan has this gift which belonged to Stevenson, to Eugene Field, and to few living writers.

The children's stories, which he was accustomed to tell every Sunday morning when he was pastor of the Mount Pleasant Congregational Church, Washington, neither began with a text like a sermon nor ended with a moral like a fable. The children were left to find the lesson for themselves and they found it. Their elders were equally interested and impressed with these unpretentious tales.

"The Dreams of Youth" are the sort of stories that children love to hear read to them over and over again.

Religion
Science News-Letter, March 17, 1928

ADVENTURE—Burnett H. Streeter and others—Macmillan (\$2). A series of essays in that difficult and fascinating twilight zone where science, philosophy and religion impinge on each other.

Philosophy
Science News-Letter, March 17, 1928

RESEARCH IN THE HUMANISTIC AND SOCIAL SCIENCES—Frederic Austin Ogg—Century. Status of research, its tendencies and directions, in these branches of learning, as revealed by a recent survey.

Sociology
Science News-Letter, March 17, 1928

MAJOR SPORT FUNDAMENTALS—Charles Edward Hammett—Scribners (\$2). A guide to the making of winning teams in football, baseball, basketball and track.

Sports
Science News-Letter, March 17, 1928

A COURSE IN GENERAL BIOLOGY—Henry Sherring Pratt—Ginn (\$1.48). A compact laboratory manual for a course on the type basis.

Biology
Science News-Letter, March 17, 1928

ANNALS OF NIAGARA—William Kirby—Macmillan. A new edition of a Canadian history of Niagara and the events that took place around it.

History
Science News-Letter, March 17, 1928

THE AMERICAN AND THE GERMAN UNIVERSITY—Charles Franklin Thwing—Macmillan (\$2.25). A man who is thoroughly acquainted with American universities from the inside discusses the part that the German universities have played in their development.

Education
Science News-Letter, March 17, 1928

Big Trees Hurt by Feet

Botany

Ancient mythologies tell of gods slain by their worshippers; and something of the kind is happening in the Big Tree grove of Mariposa County, where thousands of tourists are unconsciously destroying that which they come hundreds of miles to admire. At the request of the National Park Service, Dr. E. P. Meinecke, U. S. Forest Service plant pathologist, has investigated the present status of the cherished sequoias and has reached the conclusion that long-continued and heavy trampling of human feet has destroyed the root endings and finer roots of many of the trees. Without these of course the trees are unable to absorb water and mineral nutrients from the soil.

The rescue of Grizzly Giant, one of the finest Big Trees in existence, from a similar fate about 25 years ago, is recalled. Trampling had destroyed its root endings, and friends of the tree were at a loss to know what to do. Finally it was suggested by George T. Harlow, at that time guardian of the grove, that the soil surrounding the tree be loosened somewhat and that additional soil be placed around the trunk and over the roots to a height of three or four feet. The experiment, though ridiculed at the time, proved entirely successful, and the old tree was restored to health.

Horticulture

Science News-Letter, March 17, 1928

Seedless Persimmons

Horticulture

The native American persimmon, which has long been an object of much local appreciation but has never been widely cultivated, is booked for a course of improvement which may put it into the class of highly desirable orchard fruits. According to a communication in the *Journal of Heredity* which will soon be issued, a search is being made for promising trees that bear seedless fruits. Such specimens are known to occur occasionally in nature. Robert T. Morris of Stamford, Conn., is undertaking to propagate seedless persimmons found in the northern part of the range of the species, and Dr. J. E. Cannaday of Charleston, W. Va., will cultivate trees found in the South. The two men invite any one who knows of a seedless persimmon tree to correspond with them.

Science News-Letter, March 17, 1928

A Statement of Purpose

(The aims, ideals and aspirations of an institution)

SCIENCE SERVICE is a unique institution, established at Washington for the purpose of disseminating scientific information to the public. It aims to act as a sort of liaison agency between scientific circles and the world at large. It interprets original research and reports the meetings of learned societies in a way to enlighten the layman. The specialist is likewise a layman in every science except his own and he, too, needs to have new things explained to him in non-technical language. Scientific progress is so rapid and revolutionary nowadays that no one can keep up with it from what he learned at school. Science Service endeavors to provide life-continuation courses in all the sciences for newspaper readers anywhere in America without tuition fees or entrance examinations.

In a democracy like ours it is particularly important that the people as a whole should so far as possible understand the aims and achievements of modern science, not only because of the value of such knowledge to themselves but because research directly or indirectly depends upon popular appreciation of its methods. In fact the success of democratic institutions, as well as the prosperity of the individual, may be said to depend upon the ability of people to distinguish between science and fakes, between the genuine expert and the pretender.

Science Service spares no pains or expense in the endeavor (1) to get the best possible quality of popular science writing and (2) to get it to the largest possible number of readers. If in doing this it can make both ends meet, so much the better. If not, it will do it anyway.

Through the generosity of E. W. Scripps, Science Service has been assured of such financial support as to insure its independence and permanence. Mr. Scripps's long and wide experience as a newspaper editor and proprietor had convinced him of the importance of scientific research as the foundation of the prosperity of the nation and as guide to sound thinking and living and he realized the need for an independent agency that would bring the results of research to the attention of the entire people so these could be applied to the solution of their personal, social or political problems.

Science Service is chartered as a non-profit-making institution and all receipts from articles, books, lectures and films are devoted to opening up new avenues for the diffusion of knowledge and developing promising methods of popular education. Although Science Service has a philanthropic purpose, it is conducted on business principles, with the aim of making each branch of its activities ultimately self-supporting so far as possible. All acceptable contributions are paid for and all published articles are charged for.

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Science Service began its work on January 1, 1921, and has now a sizable office staff with a large corps of contributors in the chief research institutions of this country and Europe.